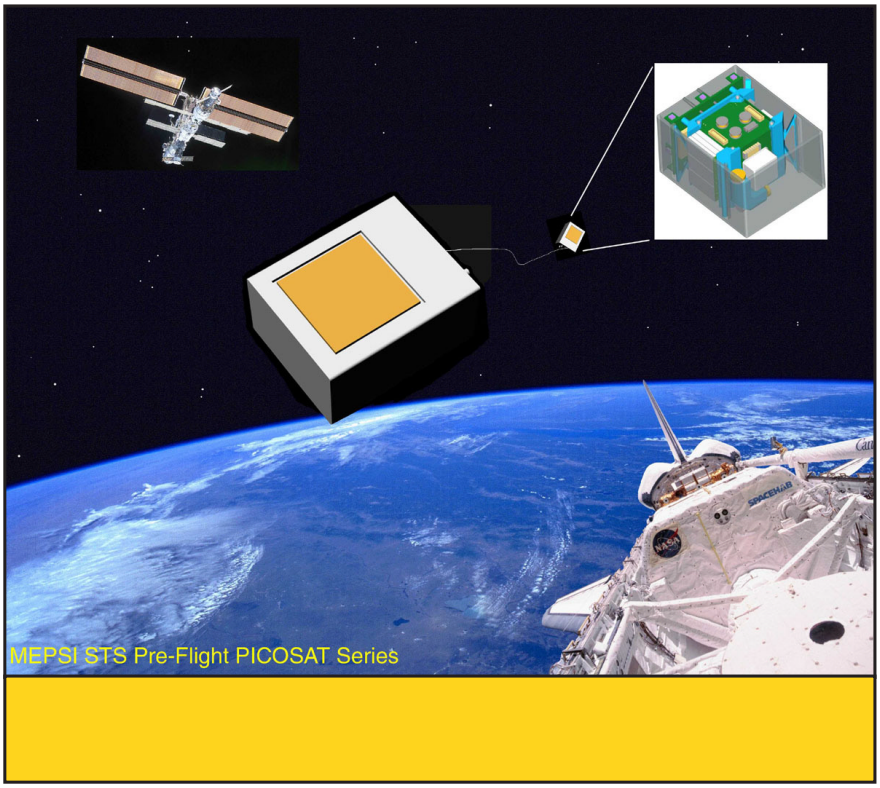
Air Force Research Laboratory | AFRL
Science and Technology for Tomorrow's Aerospace Forces

Success Story

INFORMATION DIRECTORATE PROGRAM PASSES NASA REVIEW FOR SPACE SHUTTLE FLIGHT



The National Aeronautics and Space Administration (NASA) approved an Information Directorate miniature self-inspection system payload for inclusion on the Space Shuttle. This self-inspection system enhances satellite command and control operations by providing active onboard imaging capability to assess spacecraft damages from man-made or environmental threats, monitors launch operations, and augments servicing operations.

Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

The directorate's miniature self-inspection system provides decision makers with a rapid feedback capability for detection and response to spacecraft anomalies for maintaining ultimate satellite longevity. Directorate engineers can develop the miniature self-inspection system for a particular space system or for carrying aboard virtually any host vehicle.

Operationally, the directorate's self-inspection system demonstrates the capability to store a miniature self-inspection system that can be released to conduct surveillance of its host vehicle for independent situational awareness. Once released from the host, the directorate's miniature self-inspection system assumes full autonomous control by using inertial sensors, microthrusters, reaction wheels, and high-level "smart" processing.

The directorate's miniature self-inspection system can either downlink image data in real time to the ground station or store it for downlink for future passes over the ground station. The directorate developed two concepts: "Space Onboard Servicer and Space Onboard Protector." The directorate's miniature self-inspection system provides the basis for implementing required proof-of-concept for each.

Background

The directorate's Advanced Computing Architecture Branch met with NASA for a combined safety review of this miniature self-inspection system payload. The NASA safety panel meticulously reviewed the directorate's miniature self-inspection system hardware for any concerns or hazards that could impact mission and flight crew safety.

Representatives from the Aerospace Corporation (the program's hardware integrator), the directorate, and NASA gathered and met all safety board requirements. The uniqueness of the directorate's miniature self-inspection system payload and the thorough design of the hardware allowed NASA to combine the first three safety reviews into one. NASA stated that this self-inspection system is the smallest payload ever deployed by the Space Shuttle program. The miniature self-inspection system's small size and mass (less than 1 kg) allow it to fly in previously unusable cargo bay locations.

Information
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTT, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (01-IF-09)